Poster: SEEjang: Smart, Easy, and Economical Offline Shopping Assist App Development through a Design Thinking Process

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ABSTRACT

It is difficult for shoppers to estimate the amount of cost spent while shopping offline. Existing mobile platforms can be used to assist offline shoppers, but there still remain questions about the usability and affordability of such platforms. To reduce this gap, we propose SEEjang, a prototype for providing users with a smart, easy, and economical experience with offline shopping. We developed the application through a design thinking process to maximize consumer satisfaction with offline shopping.

CCS CONCEPTS

• **Human-centered computing** → **Human computer interaction (HCI)**; **User centered design**; **Mobile computing**.

KEYWORDS

Human-computer interaction, User centered design, Mobile computing, Design thinking, Offline shopping experiences

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1 INTRODUCTION

While people go shopping offline, it is not easy for them to prepare and bring a list of items to purchase at all times. Without the list, they may purchase additional items that were not supposed to buy. They would need to cancel a lot of unwanted items and request a refund for the items after shopping. Such process of returning items reduce the productivity of workers in the market, as they would need to rearrange returned items whenever requests from customers occur. In previous studies, researchers designed and developed systems to improve the satisfaction of customers by making their experiences convenient during the shopping process [1, 3, 5]. However, little is known about the usability and affordability of such systems in real-world scenarios. For instance, when interacting with the system, users need to use additional devices, such as an optical scanner or tools for navigating virtual environments [1, 5].

In this paper, we introduce SEEjang, an application that redesigns customers' offline shopping experiences to help them make more reasonable consumption. This application is largely divided into pre-purchase screen and purchase screen. On the previous purchase screen, customers are allowed to generate and view a list of items to purchase in advance. They can also modify or delete any items on the list. In addition, customers can enter product information through the barcode scanner embedded to SEEjang, list items received by the scanner and review the list of items they purchased. By selecting a pre-planned plan and next to it, you can easily compare plans and shopping lists, which helps you make a more reasonable consumption. The rest of this paper illustrates how we designed, developed, and evaluated the mobile application through a design thinking process.

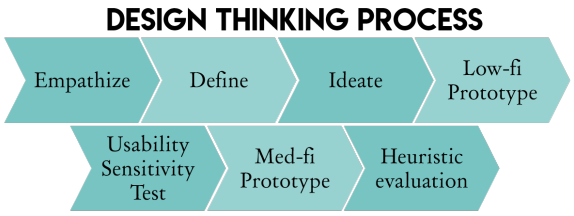

Figure 1: Design thinking process

2 NEEDS ASSESSMENT

We went through multiple steps for designing, developing, and evaluating SEEjang (see Figure 1). As an initial step, we observed people and conducted semi-structured interviews with them to understand their needs. Interview questions covered topics about users' offline shopping experiences as follows:

- Do you use your smartphone when going shopping?
- Do you go shopping as you planned previously?
- Do you have any inconvenience or wish to improve your shopping experience?

By analyzing the responses from the interviews, we identified challenges customers faced when they go shopping. We discovered that they had difficulty in keeping track of all the items they put in their shopping cart during their shopping event. In addition, they had to do extra calculations to make sure the amount of money they spent is the same as the one in their budget. We then identified customers' needs and insights. For example, they needed something

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Table 1: User Severity Test Results Table

User Severity	# of Errors	# of Pauses	# of Useless Trips	# of Unclear Items
P1	0	0	2	2
P2	0	0	3	2
P3	0	1	4	2

to generate a list of all the items they planed to purchase and to view statistics of the listed items. Based on the identified needs and insights, we created a Point-of-Views (POV) as follows: "Offline shopping customers need a quick way of reviewing information of the items they want to purchase because it is difficult to keep track of such items manually while they go offline shopping."

3 IDEATION FOR POTENTIAL FEATURES

The goal of the Ideation stage in the design thinking process was to generate solutions that would be matched with potential features of our prototype to be produced according to the POV of target users. On the basis of the point of view derived in the previous stage, we created multiple "How might we" (HMW) questions (e.g., how might we enable our users to spend rationally?, how might we show you the items we bought at a glance?, etc.). We then brainstormed 10 answers to each question and posted them on the wide wall for further discussion to determine the best answers. In the end, we chose three as the best ideas (i.e., solutions) based on the following criteria: ease of use, viability, and universality.

4 INITIAL PROTOTYPE AND TEST

We created a low-fidelity prototype users can interact with as an initial prototype of SEEjang and evaluated the usability of the prototype as follows. First, we identified assumptions that were included implicitly in the ideas we generated at the Ideation stage. We then tested assumptions for each solution by interacting with our prototype. Our focus was to evaluate with prototypes in real-world scenarios with potential target users of the prototypes. One of the features of the prototype was that customers can compare a list of items to be purchased with a list of actual items taken by the customers. Second, we created design materials, such as a series of tasks to be performed in real-life scenarios and a storyboard describing the tasks. For diversity of tasks, we created an easy, normal, and difficult task, respectively, in terms of the level of difficulty in performing each task. Third, we asked three study participants to assess the level of user severity after they perform pre-defined tasks by interacting with our low-fidelity prototype. The level of user severity was represented as a combination of the following four metrics: the numbers of errors and pauses that occurred while participants interacted with the prototype, efficiency issues (i.e., useless trips to another screen), and features that were unclear to participants. Based on the findings from the previous steps, we produced another storyboard and created a medium-fidelity prototype by using JustInMind, a free prototyping tool widely used for developing web and mobile apps[1]. Figure 2 shows a series of screenshots of the medium-fidelity prototype.

[1]https://www.justinmind.com/

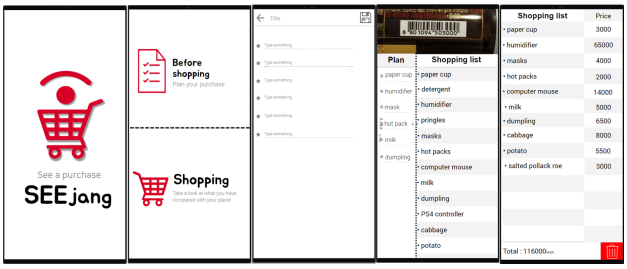

Figure 2: Screenshots of the Medium-fidelity Prototype

Table 1 shows the sum of the numbers of usability severity identified while tasks had been completed. Through the usability severity test, we found issues to be modified for improving efficiency and easy of use of SEEjang. In addition to the usability severity test, we invited three design experts and asked them to conduct a heuristic evaluation [4] for verifying the heuristics of SEEjang based on the infractions and heuristic improvements of the evaluation. Through the heuristic evaluation, we found that some icons should to be added to a screen of SEEjang for better navigation. We also found that the next version of the prototype should include additional functions to remove or modify items on the shopping list.

5 CONCLUSION

We propose SEEjang, a novel mobile application for providing shoppers with better offline shopping experiences. We developed a mobile application redesigning offline shopping experiences of customers through the design thinking process from needs assessment to prototype test [2]. One of the key features of SEEjang is that it enables customers to manage their shopping plans efficiently through the recognition of the barcode assigned to each item on a shopping list. Moreover, while existing platforms for shoppers asked customers to bring additional devices [1, 5], shoppers only need to interact with SEEjang on their smartphones for performing tasks for managing items for their offline schopping, such as scanning the barcode of each item in their shopping carts. Future work still remains to evaluate the feasibility and validity of SEEjang with target users through a long-term period deployment study.

6 ACKNOWLEDGMENTS

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